

*Research*  
**project**

***SUMMARY***

abstracts



## Brown Medical School/The Miriam Hospital

### Project Name ...

*The PAQS Project*

### Principal Investigator ...

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### Background / Significance of Problem ...

The PAQS project (Parents of Asthmatics Quit Smoking) contrasts two theory-based smoking cessation interventions for parents of children with asthma and compares mechanisms of behavior change. We hypothesize that enhancing the perception of risk to self and child will motivate smoking cessation more than standard approaches in a population that is largely not motivated to quit smoking. Smokers ( $n=288$ ) and their asthmatic children who receive nurse-delivered in-home asthma education (as part of the insurance carrier's standard of care) are randomized into one of two treatment conditions: 1) The Behavioral Action Model (BAM), in which nurses emphasize goal-setting and skill building to enhance self-efficacy to quit smoking, or 2) The Precaution Adoption Model (PAM), in which nurses tailor the intervention to the smoker's readiness to quit and incorporate biomarker feedback (i.e., level of Carbon Monoxide exposure to the smoker and level of Environmental Tobacco Smoke [ETS] exposure to the child) in order to increase risk perception. In both conditions, smokers who are ready to quit receive the nicotine patch.

### Research Question ...

- PAM will outperform BAM on: Change in motivational readiness to quit; biochemically verified 7-day point prevalence abstinence; reduction of ETS; and number of quit attempts.
- The mediators of behavior change proffered by the PAM theory (e.g., risk perception) will change differentially in those receiving PAM vs. those receiving BAM. BAM mediators (e.g., self-efficacy) will be specifically sensitive to the BAM intervention.
- We hypothesize that the above ETS and smoking outcomes for caregivers will, in turn, result in a variety of improvements in asthma outcomes.

### Findings To-Date ...

- **Characteristics of the Sample:** To date, 209/288 participants have been recruited and completed a baseline questionnaire. The average age is 32.2 years ( $\pm 8.3$ ) and 89.5% are female. Forty percent were never married, 40% are currently married, engaged or living together, and 20% are divorced/separated. The ethnic composition of the sample is: 53% White, 22% Black, 19% Hispanic, 2.0% American Indian, and 2% Cape Verdean. Thirty percent are employed full-time, and the majority reported incomes of less than \$20,000 per

year (67%). The average number of cigarettes smoked per day is 14.4 ( $\pm 9.3$ ) and the average score on the Fagerstrom Test from Nicotine Dependence was 6.2 ( $\pm 1.4$ ). The mean score for the CESD was 18.4 ( $\pm 11.8$ ), a level that exceeds the cut-off for depression.

- The average age of the child with asthma was 5.9 ( $\pm 4.8$ ) with a range of less than one year old to 17 years of age. On average, children had mild asthma, 9 days of asthma symptoms in the previous month ( $\pm 10.83$ ) and missed an average of 5 days of school due to asthma in the previous year ( $\pm 8.88$ ). 58% of parents reported that their child had ever received oral steroids for asthma, 9% endorsed a history of a respiratory arrest due to asthma, and 5% indicated a history of intubation for asthma. Furthermore, at baseline, 61% of the sample reported that their child had been seen in the ER in the previous year for asthma and 33% reported that their child had been hospitalized for asthma in the previous year.
- **Smoking Outcomes for Caregivers** (at 2-month follow-up):`

	<u>Education</u>	<u>Counseling</u>
7-Day Point Prevalence Abstinence	14.3%	28.6%
Continuous Abstinence	9.5%	14.3%
Attempted to Quit	66.7%	81.0%
Used Nicotine Patch	57.1%	70.0%
Requested Nicotine Patch	35.0%	49.0%

None of the above differences were significant, likely due to lack of power. We are continuing to recruit and follow-up with our sample.

- **Asthma Outcomes for Children:** At baseline and end of treatment, parents were asked to report on the frequency of their child's asthma symptoms in the past month, including episodes of wheezing, nighttime coughing, early morning symptoms, severe symptoms, and activity and sports limitation due to asthma. No group differences were found at baseline, but at the end of treatment, the Education group reported a higher mean asthma symptom score than the Counseling group though this was not significant.
- We also assessed asthma-related healthcare utilization (e.g., ER visits in past month, days hospitalized in the past month, doctor visits past month) and school absences via parental report at baseline and end of treatment. No baseline group differences were found in healthcare utilization, school absences, ER visits, or hospitalizations. At end of treatment, the Counseling group reported fewer ER visits ( $p < .05$ ) and fewer doctor visits for asthma in the previous month ( $p < .03$ ). No other group differences at the end of treatment were found.

*Implications ...*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

Our research compares an intervention based on the precaution adoption model, which aims at increasing risk perception, vs. a standard care intervention based on social cognitive theory, which aims at increasing goal setting and self-efficacy. We hypothesize that the intervention condition will outperform the standard care condition, and that risk perception will change differentially in the intervention vs. standard care condition. Preliminary analyses are underway.

*Future Research Directions ...*

We will examine our intervention's effect on other variables, such as reduction in ETS.

## Weill Medical College of Cornell University

### Project Name ...

*Healthy Behaviors Program*

### Principal Investigator ...

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### Background / Significance of Problem ...

Data from clinical trials and statewide registries of percutaneous transluminal coronary angioplasty (PTCA) and stents show that between 30% and 40% of angioplasty patients have recurrent angina, myocardial infarction, death or repeat procedures by two years' of follow-up. Given the high recurrence rate, a World Health Organization expert committee has recommended that cardiac rehabilitation including interventions directed at reducing cholesterol through diet or lipid lowering agents, reducing weight, increasing exercise and stopping smoking should be provided for all patients undergoing PTCA. In spite of consensus that behavior change is vital for PTCA patients, post-procedure rehabilitation efforts have been ineffectively implemented in this population. Patients who have undergone angioplasty may underestimate their risk of future coronary artery disease and the potential benefits of modifying their risk behaviors- at present and in the future. Researchers have suggested that they study of human economic behavior, specifically net-present value economic theory, holds promise as a theoretical underpinning for behavioral interventions applied to health. Our current randomized controlled trial among PTCA patients tests whether the "net present value" approach to presenting risk will enhance motivation to make behavioral changes, and we are comparing the outcomes to the standard "future value" approach.

### Research Question ...

The study is designed to evaluate whether a novel behavioral intervention based on individualized feedback of risk profiles framed as the opportunity to reduce one's biologic age (net-present value) is more effective in reducing mortality and major cardiovascular morbidity than the standard risk reduction approach (future value). Since the trial is not closed, all preliminary data have been analyzed without regard to randomization group.

### Findings To-Date ...

- Participant recruitment began September, 1999 and baseline assessments and intervention were completed with 660 patients as of March, 2001. Follow-up sessions with enrolled patients occur every three months for two years post-procedure.
- Demographics and clinical characteristics: The mean age of the patients is 62 years ( $\pm 11$ ), and 27% are female; 22% are African American or Latino; 63% were married; 42% were

college graduates; 43% were working full time, and 37% were retired. Patients enrolled have presented with moderate coronary artery disease; 58% had unstable angina prior to angioplasty; 37% had a prior myocardial infarction. The mean ejection fraction is borderline normal ( $51 \pm 10$ ) and the majority (65%) received angioplasty or stenting in only one vessel. At baseline only 17-22% of our sample had undergone prior bypass surgery or angioplasty/stenting; 57% had hypertension; and 26%, diabetes; 65% had only one vessel angioplasty/stent, while 26% had two vessels, and 8% three or more vessels. Depressive symptoms were assessed in the baseline interview using the Center for Epidemiological Studies depression scale (CES-D). Scores on this measure range from 0 to 60, with higher scores indicating higher depressive symptoms. One-third (33%) of patients scored 16 on the scale, the standard criterion indicating possible clinically significant depression. 33% of patients were depressed at baseline and 15% had no social support. At 12 months, 12% had persistent depression. Baseline depression ( $p=0.004$ ) and poor social support ( $p=0.04$ ) predicted depression 1 year after angioplasty.

- [•] With respect to multi-behavior change at one year, 59% of patients reached action on at least one health behavior and 26% on two or more behaviors. In total, 33% of patients reached maintenance on one behavior and 17% reached maintenance on two or more behaviors. Final two year assessment has not yet been completed.
- [•] Behavior changes of interest included increasing physical activity, smoking cessation, cholesterol reduction, weight loss, and controlling diabetes. On average, patients had 3-6 risk factors that were recommended for change, from which they chose 2-3 for change. The most common risk factors chosen for change were overall physical activity, smoking cessation and weight loss. Patients had high self-efficacy immediately after angioplasty. For any given behavior change, patients were in either the precontemplation, contemplation, preparation, action or maintenance stage of change (as defined by the Transtheoretical Model). Immediately after angioplasty, most patients reported they were in the preparation stage on their chosen risk factors, which is noteworthy because, in most studies, the majority of patients are either in precontemplation or in action/maintenance. Implications ...

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

We conclude that angioplasty patients have a problem in initiation and maintenance of multiple-behavior change. In order to identify the characteristics, sequence, and attributes of patients who have successfully initiated and sustained behavior change in two or more behaviors at 12 months, patients were given the opportunity to select new factors, and the stage of change was assessed at each follow-up.

*Future Research Directions ...*

Finding an effective means to help patients modify their behavior presents a unique challenge. There is a problem in initiation and maintenance of multiple-behavior change among patients with chronic cardiac illness. Based on the analyzed results of our current trial, characteristics, sequence, and attributes of patients who have successfully initiated and sustained behavior change in two or more behaviors at 12 months will allow for future research to evaluate interventions that influences stages of change and behavior-specific self-efficacy. New randomized trials can build on the results of the current trial evaluating the two approaches to framing health risk information (present value vs. standard value) in motivating behavioral changes and improving two-year outcome.

## Emory University

### Project Name ...

*Healthy Body, Healthy Spirit*

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### Background / Significance of Problem ...

Dietary patterns and sedentary lifestyle together account for between 300,000 and 500,000 deaths each year ranking second only to tobacco use. Diets high in fat and low in fiber are associated with higher death rates of coronary heart disease (CHD), colon, breast, and other cancers, stroke, and diabetes, whereas high fruit and vegetable (F&V) intake has been shown to be protective for certain cancers, stroke, CHD, and age-related blindness. Likewise, a sedentary lifestyle has been associated with higher mortality rates due to CHD, stroke, colon cancer, and diabetes. Increasing the proportion of Americans who consume at least five servings of F&V per day as well as the proportion who engage in moderate to vigorous physical activity (PA) for 30 minutes per day are national health priorities.

### Research Question ...

This study will test the effectiveness of a culturally-sensitive self-help diet and PA intervention among African Americans, as well as the effectiveness of adding four telephone counseling calls to the self-help intervention. Group 1 (Comparison=C) will receive standard PA and nutrition education materials; Group 2 will receive an intervention package (Tx1) that will include culturally-sensitive nutrition and physical activity videos, an audio tape, cook-book, and written materials; Group 3 (Tx2) will receive the same intervention as Group 2, plus 4 telephone counseling calls based on Motivational Interviewing (MI). The study will test three primary hypotheses: H1—Individuals receiving a culturally-sensitive multicomponent intervention (Tx1) will show significantly greater improvement in diet (e.g., fruit & vegetable intake) and PA patterns than those receiving standard exercise and nutrition education materials (C). The primary goal of comparing groups C and Tx1 is to determine the efficacy of a self-help intervention developed using our “deep structure” model of cultural sensitivity, described below. H2—Individuals receiving a culturally-sensitive intervention plus four telephone counseling calls using motivational interviewing techniques (Tx2) will show greater improvement in diet and PA than those receiving a culturally-sensitive self-help intervention without telephone counseling (Tx1). H3—Comparing groups Tx1 and Tx2 will determine the efficacy of telephone-based MI in changing diet and PA behaviors.



### Findings To-Date ...

**Results on Fruit and Vegetable Intake:** Across the three FFQs, the change in F&V intake was largest in Group 3 and intermediate in Group 2. Based on the mean of the three FFQs, the change (subtracting the post-pre change scores) in Group 3 = 1.13 servings, Group 2 = .44 servings, and Group 1 = .17 servings. Using the composite FFQ and 19-item values, the Group x Time effect was significant for Group 3 compared to both Groups 1 and 2. For the 2-item and 36-item values, Group 3 was significantly different than Group 1. Based on the 2-item and 36-item measures (though not the composite or 19-item measures), the change in Group 2 was significantly different than the control group.

**Results on Physical Activity:** Total minutes of physical activity based on the CHAMPS measure increased significantly more in Group 3 compared to Group 1 for each of the three index scores, i.e., All activities,  $\geq 3$  METS, and Exercise Items. Group 2 increased activity significantly more than the control group for the index of all activity and activities  $\geq 3$  METS. Groups 3 and 2 did not differ on any of the three indices. Association between Intervention Exposure and Outcomes. Individuals who reporting using the cookbook and watching most or all of the F&V video from Groups 2 and 3 showed a significantly greater increase in F&V intake than those not using these materials. Similarly, individuals who reported using the activity guide showed a significantly greater increase in physical activity than those not using the guide. Although those who reported watching most or all of the activity video showed a greater increase in activity than those not watching the activity video, these difference were not statistically significant. Regular use of the pedometer was associated with a greater increase in activity, and this difference was statistically significant for moderate/vigorous activities and the index of exercise items.

**Simultaneous Change of Diet and Activity:** Overall, 39% of the sample was classified as having made little or no change for both F&V and physical activity, with the largest percent occurring in the control group. Approximately 44% of the participants reported making a moderate or large change in one health behavior but no change in the other. Specifically, this included 21% who reported a large F&V change but no change in PA; 9% who reported a moderate F&V change but no PA change; 10% who reported a large PA change and no F&V change and 5% who reported moderate PA change but no F&V change. The remaining 17% of participants reported making multiple changes. Across all three experimental groups, the most common pattern of multiple change was a large change for both F&V and PA. The other three possible change patterns, large change in F & V and moderate change in PA, large change in PA and moderate change in F&V and moderate change in both F&V and PA were infrequent, in the range of 1%-3%.

### Implications ...

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

There appear to be distinct segments of changers. Those who will make large changes in multiple behaviors, those who will change one and not another, etcetera. We may want to try to identify such segments *a priori*.

### Future Research Directions ...

More MI studies with varying intensity and duration. More work on culturally tailored interventions.



## Harvard School of Public Health

### Project Name ...

*Reducing Disease Risk in Low-income, Postpartum Women*

### Principal Investigator ...

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### Background / Significance of Problem ...

Substantial research documents benefits of a low-saturated fat, high fruit and vegetable diet, and increased activity on risk for chronic, preventable conditions, including obesity, type 2 diabetes, coronary heart disease, stroke and certain cancers. Recent data suggest an intervention design addressing interrelated behavioral risk factors, though challenging to design and implement, may maximize its impact on an individual's health and substantially reduce incidence of chronic diseases in the long term. Disparities in diet and activity behaviors and their sequelae further underscore the need for effective interventions in low-income, multi-ethnic women, yet influences at different levels may act as barriers to changing risk behaviors. Following the birth of a child, childrearing and social isolation can exacerbate these influences. The social ecological framework integrates behavior change strategies at different levels, providing a strong theoretical base for developing interventions in this high-risk population. Our intervention model fosters institutional change to support behavior changes influenced at intra- and interpersonal levels, through collaboration with institutional partners, e.g., USDA's Special Supplemental Food Program for Women, Infants and Children (WIC) and the Expanded Food and Nutrition Education Program (EFNEP). If shown to be efficacious, this program will be readily sustainable through existing federal agencies.

### Research Question ...

This intervention trial evaluates the efficacy of an educational model delivered by community-based paraprofessionals addressing multiple levels of influence on diet and activity patterns of low-income, postpartum, multi-ethnic women in the first 12 months following the birth of a child. Specifically, will improvements in primary outcomes (fruit and vegetable intake, saturated fat consumption, total moderate-to-vigorous activity) and in secondary outcomes (pregnancy-related weight retention, BMI and indicators of fat mass and distribution) be significantly larger among those assigned to treatment group when compared with those assigned to control? To what extent do various mediating and modifying factors play a role?

### *Findings To-Date ...*

We were successful in recruiting a diverse, multi-ethnic baseline sample, employing a range of strategies involving institutional partners that included adding several additional high-volume community recruitment sites and motivating staff support for recruitment by implementing incentive programs for referrals. Intervention tracking forms and monthly 'grand rounds' conducted by project staff in collaboration with EFNEP paraprofessionals provided a venue for review of individual participants in order to ensure fidelity and dose of the intervention. Among 660 women comprising the baseline analytic sample, mean age at recruitment was 27 years (inclusion criteria were 18-44 years). Three-quarters are Latina/Hispanic, 8% African American, 15% white. Almost two-thirds (64%) report Spanish as their native language as well as the language typically spoken at home (60%). The majority (54%) of Latinas are immigrants with an average time in U.S. of eight years. More than two-thirds (69%) of participants at baseline have 12 or fewer years of education; 34% did not graduate high school. At baseline, 88% (n=577) reported consuming fewer than five servings of fruits and vegetables per day. Of these, 68% planned to increase fruit and vegetable consumption to this level within the next six months. Intervention messages to reduce saturated fat intake emphasize three or fewer servings red meat per week; 52% of the sample were very sure they could limit red meat, 30% were somewhat sure. At baseline, the women were very inactive, but many were open to behavior change. Only 20% reported regular physical activity at baseline. Mean level of moderate activity estimated from the 7-Day PAR was 1.4 hrs./week, and mean vigorous activity level was .06 hrs/wk. Of those who reported no regular physical activity, 78% planned to engage in regular physical activity within the next 6 months.

### *Implications ...*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

We are currently completing post-intervention follow-up data collection on the sample. Pending an efficacious outcome of the trial, we anticipate we will demonstrate that the feasibility of multi-behavior change in low-income, immigrant new mothers will depend not only on receiving an intervention operationalizing behavioral theories at the intra- and interpersonal levels, but also on evidence of organizational change in programs serving the target population. Process implementation data will provide a useful adjunct to more formal RCT evaluation data.

### *Future Research Directions ...*

We have received supplemental funding from non-governmental sources to build upon quantitative baseline analyses of dietary carbohydrate and whole grain consumption. We will utilize qualitative measures in a mixed-methods approach to investigate social and economic predictors in order to inform development of nutrition education curricula for low literacy audiences. Pending proposals include examination of the role of food security and program participation on primary study outcomes, and formative research using mixed methods to examine maternal beliefs, practices and behaviors in the cohort that may be related to child feeding and their relationship to infant diet and growth.

## Illinois Institute of Technology

### Project Name ...

*Partners for Life*

### Principal Investigator ...

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### Background / Significance of Problem ...

Finding better ways to help patients with coronary artery disease make and sustain long-term behavioral change is essential to effective risk factor intervention and has become an increasing focus of scientific study. The American Heart Association has identified several important strategies to help patients reach and maintain behavioral change goals to reduce their cardiac risk including patient education, contracts, self-monitoring, tailoring interventions to individual needs, telephone follow-ups, and social support. The Partners for Life project incorporates these suggestions to encourage change and reduce the risk of further heart disease in patients diagnosed with coronary artery disease. Partners have been included in the behavioral change process in previous studies for weight loss, and a variety of other behavioral change programs including alcohol abuse, and smoking cessation. These studies and others suggest that a patient's ongoing, long-term relationship can influence a range of psychosocial variables related to health behaviors such as motivation for lifestyle change, maintenance of a medication program, or adherence to a treatment plan.

### Research Question ...

Based on the theoretical background from both the behavioral change and couples literature, and recommendations from the two literatures about the importance of including a partner into behavioral change program, Partners for Life was designed to determine if a couples intervention will enable participants to adhere to exercise, nutrition, and medication guidelines and sustain these changes long-term. In addition, it was designed to assess if participants in the couples group, compared with participants in the individuals group, would gain additional benefits including improved patient mood and relationship satisfaction.

### Findings To-Date ...

Preliminary results suggest that people are making changes as a result of our intervention, and for the nutritional variables where we were able to assess relapse during the follow-up period, these changes are being maintained or even continued. Additionally, the intervention is serving to reduce depressive symptoms in those beginning more depressed, and increase relationship satisfaction, into the non-distressed range, for those beginning at distressed levels. Of note, the nutritional changes that patients report are not being trans-

lated into weight loss or BMI change. Although these results are puzzling in their inconsistency, we believe the changes in diet are too small in magnitude to result in substantial, objectively measured change. Also, perhaps change is smallest in the diet/nutrition area compared to the other areas of interest because patients may believe that if they change their exercise and activity patterns, as well as adhere to their medications, they do not have to make substantial diet changes. Decreasing depression and increasing relationship satisfaction suggest that patients and partners are happy with the changes they have made to date, and it is better for their relationships. Finally, because we did not anticipate any significant differences by group to emerge at post-intervention due to the intensity of both interventions, our lack of group findings do not surprise us. What will be most interesting to us at a group level is if the groups diverge at later follow-up periods. Again, all findings must be considered preliminary due to enrollment continuing and analyses having insufficient power.

### *Implications ...*

#### *[ for multibehavioral and multi-theoretical approaches to behavior change ]*

Although both the behavioral change and couples literature stress the importance of theoretical constructs to inform clinical intervention, what has not been previously emphasized in the literature involving both couples and behavioral change is how those literatures can be combined in order to devise behavioral change programs relevant to work with couples coping with illness. For example, it is clear that Cognitive-Behavioral Couples Therapy, Self-Determination Theory, and the Transtheoretical Model of Behavior Change are all important to understanding behavioral change in couples. However, Partners for Life is the first project that has incorporated these three important theoretical constructs into one program in order to effect change across time. These preliminary findings suggest that using a multi-theoretically based intervention, including a partner, can have direct benefits on both patients and partners involved in long-term behavioral change programs especially in terms of distress and relationship satisfaction.

### *Future Research Directions ...*

Misunderstanding the additive implications of risk factors should be a focus of future investigations. It is becoming clear that participants do not consider all necessary behavior change as equally necessary for them. How they make the decisions as to what behaviors to change and sustain, versus what recommendations they do not attempt to change is important to understand. Additionally, it is necessary to study these couples across time to better understand change for the long-term. Because this project and others have demonstrated that change in behavior is possible during an intervention, and tends to drop off following an intervention, we believe the key to long-term success is long-term intervention. However, that intervention must be low cost and low-burden. Therefore, the design of a long-term intervention that is acceptable to both health care systems and their patients should be the focus of future work.

## Kansas State University

### Project Name ...

*Healthy Youth Places (Youth Environments Promoting Nutrition and Physical Activity)*

### Principal Investigator ...

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### Background / Significance of Problem ...

To reduce the risk for chronic disease, adolescents should eat at least five servings of fruit and vegetables and be physically active daily. Currently, however, youth are not meeting policy standards for these two health behaviors. During adolescence there is evidence that fruit and vegetable consumption and physical activity decline and that youths' behavioral decisions impact behavior and health through out life. Thus, adolescence may be a critical developmental period to deliver intervention strategies. Results from intervention studies targeting youth health behavior change suggest that schools are a promising setting where interventions can reach a large percentage of youth and be sustained. But, the success of school-based interventions to promote fruit and vegetable consumption and physical activity has been limited. Explanation for these small effects includes a lack of theoretical rationale for the tested intervention and a lack of sufficient implementation by school personnel of the intervention strategy. There is a need for an intervention that targets both diet and physical activity change in middle school students; draws on theory to develop a strategy to achieve health behavior change in students; and draws on theory to develop a strategy to improve the process of sustained intervention implementation in school settings.

### Research Question ...

The Healthy Youth Places Project tested if an intervention strategy that implements school environmental change with adult leader and youth participation will influence and maintain adolescent fruit and vegetable consumption and physical activity. The project developed a place-based dissemination model of multiple levels (project, school, and place) that were hypothesized to build the skills and efficacy of leaders (school staff and youth) to implement environmental changes in the school lunch place and after school place. A second aim of the project was to determine the individual and setting level processes affecting sustained physical activity and fruit and vegetable consumption.

### Findings To-Date ...

- [•] Using an experimental design, middle schools were stratified on setting level variables (school size, concentration of poverty, ethnic diversity) into three groups (large/moderate to high resource; small/moderate to high resource; large, low resource, diverse) and random-



ized within strata to an intervention ( $N=8$ ) or comparison ( $N=8$ ) condition. The health behavior of adolescents was assessed at the middle school during the spring of the 6th grade (2000/baseline), 7th grade (2001/post-intervention), and 8th grade (2002/post-intervention 2002). During 2003, the students moved from middle school to their 9th grade year in high school and were assessed (2003/follow-up).

- At baseline, seventy-four percent of 6th grade youth (compared to 20th day enrollment reports) had active parental consent and participated in the data collection. The project was also successful in tracking 76% of the intervention and 68% of the comparison cohort across the first three years of the study. At baseline, a mixed model ANOVA revealed no differences between intervention and comparison schools on the primary outcome measures: Previous Day Physical Activity Recall, and Child and Adolescent Food Frequency Questionnaire. The Healthy Youth Places Intervention schools significantly increased 16 minutes in vigorous physical activity (VPA) over the three year study. There was a significant mixed model VPA intervention effect (Random\*Year,  $F=3.59$ ,  $p=.028$ ). There was a six-minute difference in VPA performed each day post intervention between experimental and comparison schools. No intervention effects were found for fruit and vegetable consumption (F&V). F&V consumption decreased across the study (3.67, 3.43, and 3.09 servings for 6th, 7th, 8th grades).
- The intervention significantly increased the targeted mediator of self-efficacy for school physical activity environmental change over the three years of the study. (Mixed Model random\*year,  $F=12.02$ ,  $p=.0001$ ). Control schools significantly decreased and intervention schools significantly increased in self-efficacy for school physical activity environmental change.

### Implications ...

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- The intervention process demonstrated that engaging youth and adult leaders within middle schools is an effective method for reaching a broad and representative sample of youth and increasing physical activity behavior. The intervention successfully enhanced the students' perceptions of their efficacy to change the school environment to promote healthy physical activity. Our findings provide evidence that intervention framework that involves youth and adults leaders in a participatory process to build healthy environments can have a significant impact on both the psychosocial development and physical activity of middle school youth over a three-year period.
- We are currently conducting analyses to identify the personal and setting level processes that may mediate the effectiveness of the intervention and may determine sustained behavior change. It may be that increasing self-efficacy for finding and creating supportive environments may be a particularly effective strategy for promoting the maintenance of regular PA because it may require less self-regulatory effort over time to perform a behavior in an environment that supports the behavior than it does to cope with barriers in an unsupportive environments.

### Future Research Directions ...

Although the intervention was successful in building the environmental change efficacy of youth and their physical activity, the intervention did not influence fruit and vegetable consumption. Because the intervention site coordinators and youth leaders were facing a constant battle of competing demands by attempting to promote two behaviors in two places (school lunch and after-school programs), future studies implementing the Healthy Youth Places process may have greater effects if there is a focus on developing the social and physical of one healthy place at a time (either after-school programs or school lunch).

## Oregon Health & Science University

### Project Name ...

*PHLAME: Promoting Healthy Lifestyles: Alternative Models' Effects*

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### Background / Significance of Problem ...

Compelling evidence indicates the benefits of regular physical activity, diets low in fat and high in fruits and vegetables, and maintenance of a healthy body weight; however, most Americans do not adhere to these recommendations. PHLAME's lifestyle objectives reflect those four behaviors, and the study compares a testing-plus-results-only control group and two worksite health promotion strategies: 1) a team-centered peer-taught scripted curriculum; and 2) one-on-one meetings with a trained counselor using motivational interviewing (MI) techniques. PHLAME's team-centered curriculum uses principles of adult learning and is grounded in social learning theory, with one's actions being influenced by 'external' observations, vicarious experiences and peers. MI is a client-centered communication strategy, which facilitates defining one's 'internal' motivation for change by resolving ambivalence and choosing means to actualize personal goals. PHLAME's subjects are professional firefighters. Despite their work demands, they have a high prevalence of sedentary lifestyles, obesity, hypertension, dyslipidemia and certain malignancies, and their work structure is a natural setting for a team-centered program.

### Research Question ...

Our primary outcome measures for the prospective head-to-head comparison reflect PHLAME's four health promotion goals, potential mediating variables, stage of change and secondary consequences of those actions, e.g., lipid levels and blood pressure. Newer statistical methods, such as hierarchical linear and latent growth modeling, are being used to validate hypothesized model structure, and identify relationships and sequences among variables/mediators. The process assessments allows distinguishing effects of the interventions and their implementation.

### Findings To-Date ...

- Randomization by fire station resulted in three similar groups. Year 1 attrition was also comparable among the three conditions, with approximately 83% returning for the second test. The physiological measures and individual survey items and constructs are primarily being assessed using autoregressive generalized estimating equations (GEE) and repeated measures GEE, which take into account the subjects-nested-at-stations design.



- [•] Preliminary conclusions from the one-year follow-up data are that, by itself, the 'control' condition (testing and learning their results) improved and was associated with more regular physical activity and healthier eating habits. Despite that, both interventions achieved significant gains in all knowledge domains and significantly improved eating and physical activity habits, compared to the control group. In general, at one year, the team condition outperformed the MI group, with greater changes in outcome measures. Currently, we are examining the year 1 (T2) follow-up data after incorporating 'dosage' measures, which for the team group, requires identifying issues concerning both attendance/fidelity for team sessions and time spent working with their assigned team. In addition, as a step toward profiling those who benefit most from an intervention, we added predictors to the GEE autoregressive construct analyses. Results are interesting, e.g., smokers did not do as well with team approach, and the plan is to use a general growth mixture modeling framework to identify subpopulations who would respond to the specific interventions.
- [•] further improve and gains continued in the two intervention groups, with MI 'catching up' to the team condition. Our research group's recent activities have involved completing testing and applying for funding to continue to follow our subjects, assess the team-centered curriculum in other geographically dispersed fire departments and better understand MI for health promotion.

### *Implications ...*

#### *[ for multibehavioral and multi-theoretical approaches to behavior change ]*

The process of change appears to vary with intervention format. The team strategy is a relatively novel approach for altering adults' health behaviors, and our findings indicate it may enlist influences not available to an individual format and provide a feasible, acceptable and effective means for health promotion. The team's 'one-size fits all' approach does not incorporate the transtheoretical model, and subsequent analyses are needed to define implications of participant variability. Our population and their work setting are unique. Characteristics of the team, such as task specific cohesion, appear to affect outcome. Similar curricula could be adapted for other settings, augmented with team-building activities and assessed for their effects. The individual and team characteristics relating to study outcomes, once identified, might allow appropriate application or sequencing of strategies for individuals and different population subgroups. Although the one-on-one strategy may seem more 'clinically' applicable, counseling using MI for health promotion is a departure from the current norm, and its success depends on clearly documenting its efficacy, identifying individuals who will benefit from its use and defining characteristics of effective MI.

### *Future Research Directions ...*

In addition to the analyses mentioned, we have submitted proposals to continue to follow these subjects for durability of change, dissemination of the curriculum and analyses of Motivational Interviewing (MI) interactions. Because their mediation differs, combining team and MI may have additive or even synergistic effects. We also have applied to evaluate: 1) a peer-led team curriculum; 2) an individual MI plus peer-led team; 3) a blended MI-led team; and 4) testing and results only control group. Finally, MI for health promotion remains a 'black box,' and we are interested in combining our individual outcomes data with the more than 400 hours of taped MI interactions that we have cataloged to define critical MI behaviors and for whom and under what conditions is MI most effective.

## Oregon Research Institute

### Project Name ...

*Mediterranean Lifestyle Program*

### Principal Investigator ...

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### Background / Significance of Problem ...

Coronary heart disease (CHD) is the leading cause of death and functional limitations among women in the U.S. Postmenopausal women with diabetes are at especially high risk of CHD, but CHD research with this population is very limited. Epidemiological and clinical studies suggest that diabetes is associated with increased risk for CHD that is greater in women than in men. CHD is a major cause of death and functional limitations in women, but the vast majority of CHD studies have primarily involved middle-aged men. There is convincing research evidence that healthy lifestyle behaviors, including low-fat diet, physical activity, stress management, smoking cessation, and social support, can reduce CHD risk.

### Research Question ...

The overall goal of this project was to test a practical, theory-based intervention to achieve long-term behavior change for women with type 2 diabetes at high risk for developing coronary heart disease (CHD). We conducted a randomized trial to compare short-term (6-month) outcomes in women receiving usual care compared to a modified Ornish-type comprehensive lifestyle management (CLM) intervention. After 6 months, women in the CLM condition were randomized to one of two approaches for providing support – either lay-led group support or personalized computer-based support – to evaluate these strategies in enhancing longer-term maintenance of effects. Outcomes included multiple CHD lifestyle behaviors (e.g., dietary intake, exercise levels, stress management, smoking cessation), physiological risk factors associated with CHD (e.g., serum lipids, hypertension, weight, vascular reactivity), HbA1c, and quality of life (e.g., depression, functioning).

### Findings To-Date ...

- [•] **BEHAVIORAL OUTCOMES:** In intent-to-treat analyses, Mediterranean Lifestyle Program (MLP) participants showed significantly greater improvement in dietary behaviors, physical activity, stress management, at 6 and 12 months compared to a usual care (UC) control condition.
- [•] **PHYSIOLOGICAL OUTCOMES:** Multivariate analyses of covariance revealed significantly greater improvements in the MLP condition compared to the usual care group on hemoglobin A1c, body mass index, plasma fatty acids, and quality of life at 6-month follow-up.

- [•] **PSYCHOSOCIAL OUTCOMES:** At the 6- and 12-month assessments, MLP participants made significantly greater improvements than UC participants on measures of diet behavior self-efficacy, exercise behavior self-efficacy, and confidence in overcoming challenges to illness management. Those treatment effects are important because self-efficacy has a significant influence on self-management and clinical outcomes, even after controlling for the strong predictive effect of past levels of self-care. Clinical depression occurs in 15-20% of people with type 2 diabetes, and interferes with adequate self-treatment and glycemic control. While we did not specifically intervene on depression and did not select a clinically depressed sample to study, the MLP condition showed decreases and the UC condition showed increases in depression, and the between-group difference in depression was marginally significant ( $p=.053$ ) at 6-month follow-up.
- [•] **SOCIAL RESOURCES:** Compared to UC, MLP participants reported significant improvements in social support following the first 6 months of intervention. This effect was maintained at 12 months. Those improvements included increases in the amount of perceived emotional and tangible support, and increases in support from friends and family members. Our measure of personal, social, and community resource use, the Chronic Illness Resources Survey, also showed a significant treatment effect at the 6- and 12-month assessments. We conducted analyses to determine if the MLP intervention was differentially effective for women who varied on education, income, employment status, comorbid illness, and several indicators of pretreatment levels of social support. Results showed no indication that the effects of the MLP intervention on diet, exercise, or stress management were affected by a large number of background characteristics.

### *Implications ...*

#### *[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- [•] The next step in this research is to investigate the poorly understood natural history of long-term maintenance of change in multiple behaviors (i.e., dietary, physical activity, and stress management) related to CHD risk, as well as the effects of theoretically important mediating variables on relapse and maintenance. This research could rely on a framework that synthesizes social-cognitive, social-ecologic, and goal-systems theories. It should also provide important scientific and theoretical information about the patterns of maintenance/relapse among multiple risk factors, and about the relative importance of theoretical mediating variables (e.g., self-efficacy, problem-solving, peer and community support). This natural history of maintenance may be examined using a variety of statistical approaches, including mediational and latent growth modeling techniques.
- [•] In addition, the potential for translating this program into the real world could be assessed using the RE-AIM evaluation framework, a cost-effectiveness analysis should be conducted, and, if the approach is cost effective, the intervention should be disseminated.

## Stanford University School of Medicine

### Project Name ...

*Exercise Advice by Human vs. Computer: Testing 2 theories*

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### Background / Significance of Problem ...

Expanding the reach of successful behavioral interventions to increase regular physical activity (PA) represents an important public health challenge, as well as an opportunity to evaluate the predictive ability of two different theories of motivation: Social Influence Theory and Self-determination Theory. Social influence approaches represent a means of enhancing extrinsic motivation (i.e., forces originating outside of the person) for behavior change, while Self-determination theory focuses on the intrinsic motivational forces of perceived competence and autonomy that can promote and potentially sustain behavior change over time.

### Research Question ...

This study compared telephone counseling delivered by humans (social influence enhancement) vs. automated technology (self-determination enhancement). We randomized 218 sedentary, healthy men and women aged 55 years and older ( $M=60.6$  years  $\pm 5.5$ ) to a telephone-based PA counseling program delivered by health educators, the same program delivered by a computerized, automated telephone counseling system, or an attention-control (health education) program. The major outcome was weekly minutes spent in moderate or more vigorous PA, measured by the Stanford 7-Day Physical Activity Recall (PAR) and validated via accelerometry. Other PA measures developed specifically for older adults (i.e., the CHAMPS PA questionnaire and the Yale PA questionnaire) were included to add to the literature concerning how sensitive to change such instruments are in the context of PA interventions. A range of self-report and health measures were also collected to evaluate potential moderators and mediators of intervention effects across the 18-month trial.

### Findings To-Date ...

- [•] During the 6-month adoption phase, participants in both the health educator-delivered and automated telephone counseling programs significantly increased their PA above the 150 minutes/week recommended by the current national guidelines, while participants in the control arm remained under-active (i.e., 169, 174, and 103 baseline-adjusted mean minutes/week, respectively,  $p < .02$ ), with no differences between the two intervention arms.
- [•] While the 7-Day PAR and the CHAMPS were both shown to be sensitive to change at 6 months, the Yale was not found to be sensitive to change. This underscores the importance of choosing instruments to evaluate change as part of a PA intervention that have a proven track record of doing so in other intervention studies.

- Preliminary 12-month results indicate that participants in the two intervention arms maintained these levels of activity.
- Exercise-specific self-efficacy (confidence) and other motivational processes increased significantly and similarly in the 2 intervention arms relative to controls ( $p < .02$ ). These motivational processes included enlisting support for PA from family and friends, committing oneself to becoming more active, and rewarding oneself for positive improvements in PA.
- A gender x arm interaction was found for the autonomy orientation process variable at 6 months. (This variable measures feelings of autonomy and control that individuals perceive related to their physical activity program.) Women assigned to the Human Advice arm had significant increases in feelings of autonomy and control for physical activity relative to the other arms, while men assigned to the Computer Advice arm had the greatest increases in this variable relative to the other arms. Such increases may predict PA participation over time.
- Application of signal detection analysis in the exploration of baseline moderators of 6-month intervention effects support the theory-based predictions for the project stemming from social influence and self-determination approaches. Specifically, participants with initial above-average levels of social anxiety were less likely to succeed in the Human Advice arm at 6 months relative to participants with lower social anxiety levels. The success rates for socially anxious individuals were found to be higher in the Computer Advice arm relative to the Human Advice arm. Meanwhile, participants with initially low levels of controlled motivation, indicating that they preferred not to have other people tell them what to do, had higher 6-month success rates in the Computer Advice arm relative to participants with greater preferences for accepting guidance from other people.

### Implications ...

#### *[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- The results underscore the utility of automated telephone counseling systems for physical activity as an efficacious and potentially lower-cost alternative to human counseling.
- They also provide initial information related to which subgroups of individuals might be particularly successful with computer vs. human counselor. The subgroup analyses undertaken thus far support applications of the two theories in better determining which types of interventions might prove most successful with which types of people.
- Results thus far have identified potentially important mediators of intervention effects for the two programs, including physical activity-specific self-efficacy and social support, other behaviorally-oriented motivational processes of change, and perceived autonomy and control for PA change. Such mediators will be further assessed through evaluation of their predictive effects for PA participation in months 7 through 18.

### Future Research Directions ...

We will evaluate the sustained effectiveness of each program through 18 months, as well as undertaking cost-effectiveness analyses. We will also continue to explore the potential matching of empirically derived subgroups to the two types of intervention approaches. The results of this research will provide important information related to the potential public health impact of different telephone-assisted PA counseling programs for different segments of the older adult population.



## University of Maryland

### Project Name ...

*Testing the Effectiveness of the Exercise Plus Program*

### Principal Investigator ...

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### Background / Significance of Problem ...

Hip fracture is a major public health problem with striking consequences for the older adult, his or her family, and the health care system. By the year 2040, more than 650,000 hip fractures will occur annually in older adults over the age of 65. Recovery following a hip fracture has been shown to be greatly facilitated by participation in a rehabilitation program, and continued participation in a regular exercise program can improve functional recovery, muscle strength, and prevent future fractures. Despite the benefits of exercise, it is difficult to get older adults to initiate exercise activity, and helping them adhere to an exercise regime is even more challenging. It is essential to find ways to increase exercise activity in older adults. Self-efficacy, a belief in the individual's capabilities to perform a course of action to attain a desired outcome, and outcome expectancy, the belief that carrying out behavior will lead to a desired outcome, are hypothesized to be critical factors in adhering to a regular exercise program. The primary aims of this study are to implement a home delivered self-efficacy based intervention to strengthen efficacy expectations (self-efficacy and outcome expectations) related to exercise, decrease perceived barriers to exercise, and improve exercise behavior and overall activity of older adults who have sustained a hip fracture. The secondary aims focus on the anticipated benefits that are expected to occur when older adults exercise regularly.

### Research Question ...

The primary aims of this study are to: 1) Test the effectiveness of the Exercise Trainer component of the intervention (i.e. regular home visits from an exercise trainer) on exercise behavior, activity, and efficacy expectations (self-efficacy and outcome expectancy) related to exercise at 2, 6, and 12 months following a hip fracture (hypothesis 1); 2) Test the effectiveness of the Plus component of the intervention (i.e. motivational intervention provided at home) on exercise behavior, activity, and efficacy expectations related to exercise at 2, 6, and 12 months following a hip fracture (hypothesis 2); 3) Determine if the Exercise Trainer component is enhanced by the Plus component (i.e., the Exercise Plus Program) with regard to exercise behavior, activity, and efficacy expectations related to exercise at 2, 6, and 12 months following a hip fracture (hypothesis 3).

### Findings To-Date ...

- At this point in time a total of 151 participants have been enrolled in the study. The majority of these individuals are Caucasian and the average age is 82. Preliminary findings show some positive trends in terms of the effectiveness of the Exercise Plus Program on improving adherence to exercise. Participants exposed to any of the treatment groups reported more time exercising and engaging in physical activity, less fear of falling at 6 months, better function at 2 months for those in the exercise only and exercise plus groups, and better function at 6 months for those in the Exercise only and Plus only groups. Participants in treatment groups were more likely to report that they intended to initiate an exercise program in either the next 30 days or the next 6 months.

### *Implications ...*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- These findings provide some support for both theories used in the development of the interventions. In addition, although results are preliminary there is some support to suggest for ongoing monitoring of outcomes to establish if these benefits will last over time. In addition, it is possible that inoculation treatments may be needed to not only help those who are exercising to continue to do so, but to help those who report an intention to exercise to actually initiate exercise.

### *Future Research Directions ...*

Future research will focus on monitoring the impact of the Exercise Plus Program over time. In addition, qualitative work throughout the course of the study has helped to identify areas in which the intervention could be improved to better facilitate behavior change. Moreover, specific issues related to behavior change among older adults (i.e., cognitive issues and physical problems such as sensory changes) were noted and the interventions may need to be adjusted to better meet the needs of individuals with these specific impairments.



## University of Michigan

### Project Name ...

*Better Health (Tailored Interventions for Multiple Behaviors)*

### Principal Investigator ...

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### Background / Significance of Problem ...

The University of Michigan's Health Media Research Laboratory, in collaboration with Henry Ford Health System, is evaluating the impact of a longitudinal computer-based tailored print intervention and complementary web-based tailored telecounseling intervention among roughly 3,000 HMO enrollees.

### Research Question ...

Through a randomized, 2x2 factorial trial, we are determining effectiveness of the interventions, both individually and in combination, in achieving behavior change in three targeted health risk behaviors: low vegetable consumption, cigarette smoking, and sedentary behavior. Three- and twelve-month behavioral effects of the individual and combined treatments are being evaluated.

Features of the project include: (1) use of multiple eHealth strategies, including the web, computer-tailored print, and the electronic medical record; (2) interaction of eHealth tools with a trained health specialist; and (3) implementation in a realistic, generalizable setting.

### Findings To-Date ...

Current follow-up data provide sufficient power to examine intervention effects on vegetable consumption. Tailored print materials resulted in a .41 serving improvement in vegetable consumption three months after baseline assessment versus a .08 serving improvement among those not receiving tailored print ( $p=.02$ ). This difference was greater among African American subjects (.61 versus -.16 serving improvement;  $p=.02$ ).

### Implications ...

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

At this stage of the trial, the tailored print material intervention is demonstrating a significant effect on vegetable consumption. We have not found this effect in the telecounseling intervention, which has not demonstrated a significantly effect on vegetable consumption, nor have we found a synergistic effect of both tailored print materials and telecounseling. Results to-date suggest that an inexpensive, high-reach program can be effective in enhancing vegetable consumption if it is tailored to the specific needs and interests of the user.

*Future Research Directions ...*

Tailored programs should be further tested on the World Wide Web, a far less expensive alternative to tailored print materials. These programs should also be examined for their effectiveness in maintaining long-term behavioral change.

## University of Minnesota

### Project Name ...

*Challenge Project*

### Principal Investigators ...

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### Background / Significance of Problem / Research Question ...

The benefits afforded by reductions in unhealthy behavioral practices and increases in health behavioral practices are almost always contingent on those practices being sustained over time. Thus, successfully adopting a healthy pattern of behavior (e.g., not smoking) is not sufficient. The new pattern of behavior must be maintained over time. Intervention methods that have been shown to help people successfully change their behavior have not produced similar effects on longer-term outcomes. Innovations in the design and implementation of interventions are needed that will help people not only to initiate a change in their behavior but also to maintain that change over time. Current models of behavioral decision-making offer limited guidance as to factors that might differentiate between decisions to initiate and to maintain a new pattern of behavior.

We propose that decisions regarding behavioral initiation and behavioral maintenance reflect different decision criteria. Specifically, the decision to initiate a new change in behavior is a function of people's expectations of the processes and outcomes associated with the new behavior; people will take action only if they believe that the new behavior will afford a set of experiences that are meaningfully better than those afforded by their current pattern of behavior. Decisions regarding whether to maintain a behavior are predicted to rest on people's satisfaction with the outcomes afforded by the new pattern of behavior. Moreover, people's feelings of satisfaction are predicted to be contingent on the degree to which their experiences meet their expectations. This thesis suggests that optimistic expectations regarding the outcomes afforded by a new pattern of behavior may motivate people to initiate a change in behavior but undermine their desire to maintain that behavior over time.

To test this new model, a series of four intervention studies were conducted. Two were targeted at smoking cessation and two were targeted at weight loss. Studies 1 (smoking cessation) and 2 (weight loss) were designed to test the impact of people's expectations about behavior change on initial and long-term behavioral outcomes. Specifically, participants were assigned to either an optimistic expectation or balanced expectation intervention condition. The active intervention lasted 8 weeks and participants were followed for 18 months. We predicted that participants in the optimistic condition would be more likely to initiate but less likely to sustain a change in their behavior than would participants in the

balanced condition. Studies 3 (smoking cessation) and 4 (weight loss) were designed to test the impact of how people evaluate the experiences afforded by changes in their behavior on their satisfaction with those changes. Specifically, participants were assigned to either a future-focused or a past-focused intervention condition. The future-focused intervention taught people to compare their experiences to what they wanted the behavior change to provide, whereas the past-focused intervention taught people to compare their experiences to what their life was like prior to the change in their behavior. We predicted that participants in the past-focused condition would be more satisfied with their experiences and consequently more likely to sustain the change in their behavior over time.

### *Findings To-Date /Future Research Directions ...*

At present, we are able to report initial findings for Studies 1 and 2. We anticipate data from Studies 3 and 4 to be available for data analysis in the near future. Intervention Study 1: Smoking Cessation. This study was designed to test the hypothesis that optimistic expectations about the process and outcomes associated with behavior change would facilitate behavioral initiation, but undermine people's satisfaction with the new behavior and thus undermine behavioral maintenance. Participants were randomly assigned to either an optimistic or balanced expectations intervention program. The active treatment program lasted for 8 weeks and participants were instructed to quit after the fourth weekly meeting (See King, Rothman, & Jeffery, 2002 for further details). Consistent with study hypotheses, participants in the optimistic expectations condition were more likely to be quit at the end of the active treatment program. However, the impact of treatment condition was moderated by people's prior experience with cessation. Specifically, participants who had at some point in their life experienced some success with cessation (i.e., having been quit for at least 3 months) benefited from assignment to the optimistic treatment program, whereas participants who had never had success with cessation did better when assigned to the balanced treatment program.

The impact of the intervention on initial quit efforts was mediated by participants' expectations about the consequences of cessation and their confidence in their ability to remain smoke-free. Smoking status at the end of the active program predicted status at 18 months. Intervention condition had no impact on participants' satisfaction with the consequences of their behavior (contrary to study hypotheses). However, perceived satisfaction with initial behavior change did prospectively predict behavioral maintenance. Intervention Study 2: Weight Loss. This study was designed to test the same set of hypotheses that were examined in Study 1 but operationalized in regards to weight loss. Once again, participants were randomly assigned to either an optimistic or balanced expectations intervention program. The active treatment program was designed such that the structure paralleled that used in Study 1. Thus, it lasted for 8 weeks and participants were instructed to begin efforts to lose weight only after the fourth weekly meeting. Although the direct effect of the intervention condition on weight loss (both short- and long-term) was not significant, the intervention condition did alter people's expectations about weight loss, which, in turn, predicted weight loss. Specifically, people in the optimistic intervention condition formed more positive expectations about weight loss and these expectations prospectively predicted weight loss. Similar to Study 1, intervention condition did not alter participants' satisfaction with the consequences of their behavior. However, once again, perceived satisfaction with outcomes afforded by initial weight loss did prospectively predict long-term weight control.

## University of Rhode Island

### Project Name ...

*The SENIOR Project*

### Principal Investigator ...

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### Background / Significance of Problem ...

The aging of the U.S. population poses unprecedented public health challenges to our society, particularly in the field of health promotion. The projected impact of the large cohort of baby boomers on health care services and costs is anticipated to be great. The success of public health interventions in postponing the onset of chronic illness and in providing effective management of existing disease and disability promises to have a positive impact on the quality of life of this rapidly expanding population group and potentially also on reducing Medicare costs in the future. In particular, recent attention has been focused on the importance of both increased exercise levels and improved diet for enhanced quality of life in older adults. In addition, calls have recently been made for the development of interventions that combine the reach of a public health model with the personalization of an individualized assessment and intervention-individualization combined with large-scale reach. Research examining multiple behavior interventions is especially important to assess potential interactions between the interventions (e.g., overburdening, enhancement, and additivity) that deal with questions of effectiveness and efficiency.

### Research Question ...

The primary purpose of the SENIOR project is to investigate the relative effectiveness of a Transtheoretical Model (TTM)-based multiple behavior intervention (exercise and nutrition) compared to single-behavior interventions. This study is a 2x2 experimental design with the following groups: 1) exercise intervention only; 2) nutrition intervention focusing on fruits and vegetables (F&V) only; 3) combined exercise and nutrition; and 4) a control group receiving fall prevention materials. The secondary purposes are: 1) to investigate the interventions' effects on both functional ability and general health outcomes; and 2) to investigate how older adults move along a continuum of changing their health-related behaviors.

### Findings To-Date ...

- [•] Data collection points for the SENIOR Project were scheduled for baseline, 12, and 24 months. Baseline and 12-month data only have been partially analyzed. At baseline the average age of SENIOR Project participants ( $N=1,277$ ) was 75.7 years. Data were analyzed to examine the relationships among the stage of change for exercise and F&V consumption

with regard to participant stages of readiness to change and the characteristics of participants at different levels of readiness to change their exercise and/or nutritional behaviors. The two stage of change measures were significantly associated, i.e., individuals in action/maintenance for one behavior were more likely to also be in action/maintenance for the other behavior; however, the association was small. Overall, stage of change for fruit and vegetable consumption was associated with the dietary measures and energy expenditure, but not with the activity summary score or the Up-and-Go time; and stage of change for exercise was associated with the three physical activity measures and servings of fruit per day, but not with servings of vegetables/day or estimated percent of daily calories of fat.

- These analyses suggest that individual older adults' readiness to change is behavior-specific. A total of about 950 project participants provided data for the 12-month assessment. The proportion of the sample in the action and maintenance stages at baseline did not differ on either behavior. At 12 months, the group receiving the exercise only intervention had a significantly higher proportion in action/maintenance than any of the other groups, and only this group showed a significant increase over baseline. For diet, all groups increased compared to baseline and none of the groups differed significantly at 12 months, except that the exercise only group resulted in significantly less action/maintenance for F&V consumption.

### *Implications ...*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- Baseline data analyses suggest that individual older adults' readiness to change is behavior-specific. At 12 months, results appear to suggest that although the exercise intervention did increase physical activity, it may also have decreased fruit and vegetable consumption. While these results are quite preliminary, this finding would represent the first time that a stage-tailored intervention for one behavior has had a negative impact on another behavior.
- Since we have not seen this result with other samples receiving multiple behavior interventions, our present working hypothesis is that this may be a sample-based result. However, this interpretation is not entirely clear, because a comparison of groups that received the diet intervention, against those that did not, shows a marginal increase in fruit and vegetable consumption for the combined diet groups. Since TTM-tailored interventions have invariably shown increases in the proportion in action/maintenance even 12 to 24 months after the end of interventions, we feel it is important to interpret these results as very tentative at best.

### *Future Research Directions ...*

The SENIOR Project has applied for the RFA OB-03-003 on "Maintenance of Long Term Behavioral Change," to allow us to follow the project sample for four more years, for a total of seven years from the initial baseline assessment, focusing on factors related to the maintenance of exercise and dietary behaviors. We will continue to seek funding to enable us to refine the intervention in terms of effectiveness and cost, and to improve its reach to a larger, community-based sample in Rhode Island.



## University of Rochester

### Project Name ...

*Self-determination, Smoking, Diet and Health*

### Principal Investigator ...

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### Background / Significance of Problem ...

Tobacco use and diet related to cholesterol contribute to over 700,000 premature deaths in the U.S. each year. Public Health Service Guidelines for Treatment of Tobacco Dependence assert that autonomy and its support is needed for effective treatment. However, autonomy has never been demonstrated to predict this change. Self-determination theorists hypothesize that perceived autonomy and perceived competence motivate abstinence from tobacco and adhering to diet to improve cholesterol. Because the diet outcomes are not yet available, this report will focus only on tobacco outcomes. This was a cessation induction trial (includes smokers whether they want to quit or not), in which participants were randomized to individual intensive treatment (based on SDT) or community care.

### Research Question ...

To determine if constructs of self-determined motivation (autonomy, competence, and autonomy support from providers) mediate intensive tobacco dependence and dietary interventions and outcomes such as bio-chemically validated 7-day point prevalence cessation at 6 and 18 months and reduction in intake of percentage of dietary fat and total calories.

### Findings To-Date ...

- Intention to treat analyses indicate the SDT intervention resulted in 11.8% six-month cotinine validated cessation versus 4.1% in community care ( $p < .001$ ). Those receiving the SDT intervention had significantly greater increases in autonomy and perceived competence from baseline to 1 month ( $p$ 's  $< .01$ ). In addition, participants receiving the SDT intervention perceived greater autonomy support than those in the community care condition ( $p < .001$ ).
- At 6 months, more patients in the intervention reported having taken medication than did those in community care (31% vs. 16%). Of the 52% of patients not intending to quit at baseline, significantly more made a serious quit attempt (47% vs. 32%), used medications to quit (30% vs. 10%), and were abstinent at 6 months (9.8% vs. 3.7%), all differences significant at  $p < .05$ . Furthermore, autonomy support ( $p < .001$ ), change in autonomy ( $p < .05$ ), change in perceived competence ( $p < .001$ ), and the use of medications ( $p < .01$ ) all predicted 6-month cotinine validated cessation.



### *Implications ...*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- [•] These findings confirm that patients autonomy and competence and providers autonomy support are important predictors of cessation within a self-determination theory based intensive intervention for tobacco dependence. This confirms their importance for the PHS guidelines.
- [•] Motivation for cessation, use of medications, serious quit attempts, and long-term abstinence were all significantly increased for those in the intensive intervention compared to smokers treated in the community. This was true whether the participants intended to quit smoking or not at the start of the trial. These findings have implications for extending tobacco interventions for all smokers, and suggest that the use of medications can be increased through autonomy supportive counseling about health benefits of cessation, and medication risks and benefits.

### *Future Research Directions ...*

Future directions include using SDT constructs and clinical interventions to increase long-term adherence to lifestyle change and medication taking to improve a broad range of health care outcomes. These could include cardiovascular disease, cancers, diabetes, immunizations, and a variety of health related behaviors (wearing seat belts, using sun screen, flossing one's teeth, using condoms, etc.).

## University of Tennessee, Memphis

### Project Name ...

*Health Opportunities with Physical Exercise (HOPE)*

### Principal Investigator ...

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### Background / Significance of Problem ...

There has been an extensive accumulation of evidence that supports the premise that sedentary lifestyles are a primary cause of cardiovascular disease, cancer at certain important sites, and numerous other morbidities. Despite a high level of public knowledge of the protective impact of regular physical activity on coronary heart disease (CHD) and all-cause mortality, few Americans are regularly active. Only 22% of adults meet the recommended leisure time physical activity levels for health benefits as defined by the objectives of health People 2000. Overall percentages do not appear to capture the gradient that exists across the socioeconomic (SES) strata. Clearly, there are strata, such as urban-dwelling African-Americans where sedentary living constitutes a major threat to health. Recent studies document the steep gradient of increased mortality at all ages and from nearly every cause when comparisons are made between high SES groups and low SES groups. While the connection between lifestyle or health-related behaviors and disease clearly varies for each specific morbidity, sedentary behavior is, with rare exception, a dominant explanation for elevated morbidity and mortality among the socially and economically disadvantaged.

### Research Question ...

The HOPE trial was designed to intentionally enroll mostly African American women with low incomes. It was designed to compare two theoretical models, which emphasize the importance of social influence in prompting behavior change. Social support theory and patient-provider communication theory were tested as viable models of socially oriented physical activity change based on tenets of Social Action Theory and Social Cognitive Theory. The HOPE intervention introduced social interaction processes to a novel environmental context to increase physical activity levels in previously sedentary, overweight persons. Social Action Theory posits that such social and environmental factors are necessary for behavior change.

### *Findings To-Date ...*

- Initial planning and final protocol development were completed prior to the opening of the Hope and Healing Center in January, 2000. A total of 361 sedentary patients were screened and randomized to one of the three conditions during the next 15 months and 12-month follow-up windows were closed in August, 2002. Baseline anthropometric measurements were available for 361 participants, randomly assigned to Control (C), Peer mentor (P), or Health provider (H) conditions. There were no differences in body mass index (BMI), waist girth, or blood pressure among the three groups. However, because no upper bound for BMI was set in the actual study protocol, the average BMI of approximately 37 kg/m<sup>2</sup> was higher than expected, and about 25% of participants were above the commonly accepted threshold (BMI > 40) for morbid obesity. The average age of the participants was 47 years at baseline (range 28-68), 72% are African-American and 88% are female. Also, only 37.5% of the participants were married and few were unemployed.
- The Kaiser Physical Activity Survey was completed by all 361 randomized participants at the screening visit and 92.2% of the participants at the 12-month follow-up visit. As anticipated with a facility based physical activity intervention in which moderate activities were encouraged, the most conspicuous changes occurred from baseline to 12 months in the Sports Exercise Index (SEI), the Active Living Index (ALI), and the Occupational Index (OCU) ( $p < .05$ ). Statistically significant increases were observed in the ALI and SEI indices for each of the three conditions ( $p < .0001$ ). Statistically significant increases were observed OCU index for each of two intervention conditions, H and P ( $p < .04$  and  $p < .003$ ) but not controls. When analyzing longitudinal change at 6 and 12 months from baseline, the P group significantly increased OCU score over that of the C group ( $p < .02$ )

### *Implications ...*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- This program was facility based and monitored by a phone/mail/face contact intervention format and delivered either by a peer mentor or a health provider. The preliminary results of HOPE trial suggest that for participants enrolled in a supportive physical activity program, to include regular participant contact, it is possible to increase physical activity levels in sedentary, overweight persons who begin exercising and moving. Further, it is possible to achieve change after one year of intervention in workplace activities that is greater than that of standard care intervention.
- Based on the findings cited above, the social networking and supportive aspects of the peer mentor intervention model is likely to have more lasting effects, and is likely to be more feasible as a low cost alternative to professional advice.

### *Future Research Directions ...*

Follow-up of participants in exercise intervention trials has rarely exceeded one year. Strictly defined, the maintenance period usually begins when all intervention (phone contacts, mailed materials, etc.) ceases. However, a low cost extended intervention would seem to be a natural adjunct to an intervention phase that is often short duration (up to one year) and relatively expensive. Thus, future efforts will define two maintenance phases. Phase I, where low cost, infrequent (no more than one per month) phone and mail contacts are made followed by Phase II maintenance, where the only contact is to ascertain fitness and physical activity status.